Spring 2010

CEG 730-01: Distributed Computing Principles

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CEG 730 Distributed Computing Principles

Spring Quarter, 2010

Catalog Data: Communicating sequential processes, clients and servers, remote procedure calls, stub generation, weak and strong semaphores, split-binary semaphores, and distributed termination. 3 hours lecture and 2 hours lab.

Prerequisite: CEG 433/633 Operating System or equivalent

Instructor: Dr. Soon M. Chung
403 Russ Engineering Center (775-5119)
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Class: Tu. Th. 4:10-5:25 pm at 341 Oelman Hall

Office hour: Tu. Th. 2:30-3:30 pm at 403 Russ, or by appointment.
*use e-mail for short questions.

Text Book: George Coulouris, Jean Dollimore, and Tim Kindberg, *Distributed Systems: Concepts and Design*, 4th edition, Addison-Wesley, 2005.

References:
- A. Silberschatz, P. Galvin, and G. Gagne, *Operating System Concepts*, John Wiley & Sons.
- A. Tanenbaum and M. van Steen, *Distributed Systems: Principles and Paradigms*, Pearson Prentice Hall.
- A. Tanenbaum, *Distributed Operating Systems*, Prentice Hall.

Topics: Characterization and Models of Distributed Systems (Chapters 1-2)
Networking and Interprocess Communication (Chapters 3-4)
Distributed Objects and Remote Invocation (Chapter 5)
Operating System Support (Chapter 6)
Security (Chapter 7)
Distributed File Systems (Chapter 8)
Name Services (Chapter 9)
Time and Global States (Chapter 11)
Coordination and Agreement (Chapter 12)

Grading: A:[85,100], B:[75,85), C:[65,75), D:[55,65), F:[0,55)
1. Midterm exam: 30% (5/6, Th.)
2. Final exam : 40% (6/8, Tu. 5:45-7:45 pm)
3. Project: 30% Choose either a programming project or a paper-review project by 5/13.
   - Programming project (design 7%, implementation 7%, written presentation 7%, discussion 9%)
   - Paper review project (papers studied 7%, technical quality 7%, written presentation 7%, discussion 9%)

CEG 730 Programming Project

1. Implementation of a simple parallel/distributed algorithm (such as parallel sorting, parallel searching, parallel matrix multiplication, parallel data mining, etc.) involving multiple processes and their communication (to share data or intermediate result).

2. Interprocess communication to share data (or intermediate result) can be done using Java Remote Method Invocation (RMI), Remote Procedure Call (RPC), or Message Passing Interface (MPI), based on your platform and programming language used.

3. Submit an outline of your project. (due 5/13).

4. Detail description of design, implementation, result, and discussion must be included in the final report. (due 6/8)

Technical Reference Sources:

- IEEE Trans. on Parallel and Distributed Systems
- Journal of Parallel and Distributed Computing
- IEEE Trans. on Knowledge and Data Engineering
- ACM Computing Surveys
- Journal of Supercomputing
- Proceedings of Int'l Conf. on Parallel Processing
- Proceedings of IEEE International Parallel and Distributed Processing Symposium

and others

CEG 730 Paper Review Project

1. Choose a topic and select at least 5 relevant technical papers. High-quality journal papers are preferred.
2. Summarize and compare the papers, and then add your own discussion.
3. Submit the working title and the list of candidate papers. (due 5/13)
4. Submit the final report and the papers you studied. (due 6/8)
5. Size of the final report is between 25 and 35 double-spaced pages.

Possible Topics:

- Distributed OS
- Security for distributed systems
- Distributed transaction management system
- Distributed programming languages and algorithms
- Middlewares for distributed applications
- Cluster and GRID computing
- Cloud computing
- Replica control
- Fault tolerance in distributed systems.
- Web services
- Distributed objects
- Other relevant topics

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- Journal of Grid Computing
- Proceedings of Int'l Conf. on Parallel Processing
- Proceedings of IEEE International Parallel and Distributed Processing Symposium

and others